ZyXEL

MSAN/IP DSLAM Product Guide

From IP DSLAM to Multi-Service Access Nodes

Flexible and Converged Platforms for Evolutionary IP Access Networks

Spring 2008

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Spring 2008

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Table of Contents

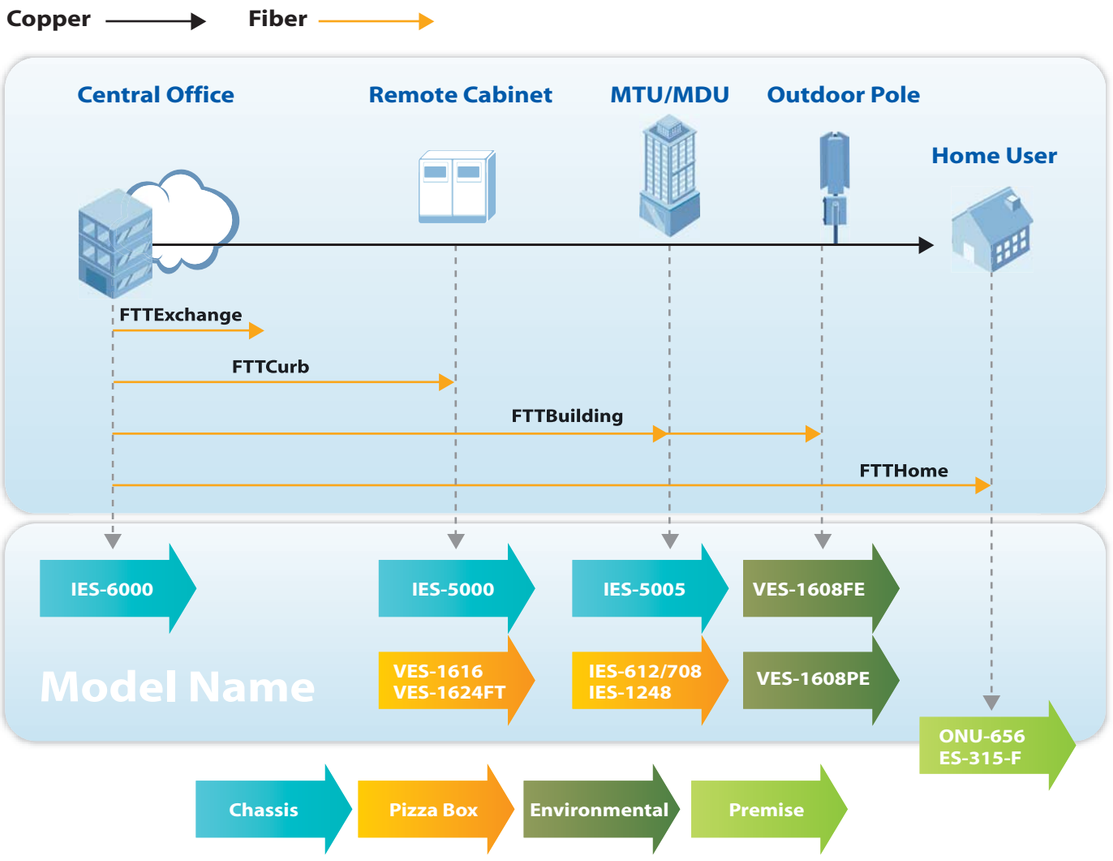
- ZyXEL's FTTX Solutions 1
- Triple Play 2
- Which ZyXEL Product is Right for You? 4
- Product Line Highlight 5
- Network Topology for MSAN Products 6
- Product at a Glance 7
- System Architecture 12
- MSAN Feature Matrix 13
- Model Description 15
- Certificate 16

Flexible and Converged Platforms for Evolution of IP Access Networks

ZyXEL's Multi-Service Access Node (MSAN) product portfolio provides the most complete FTTX solutions for various access network constructions. The temperature-hardened design for high, medium and low port density devices facilitate the deployment of Fiber-to-the-Exchange (FTTE), Fiber-to-the-Curb (FTTC), Fiber-to-the-Building (FTTB) and Fiber-to-the-home (FTTH) access infrastructure for the requirements of the rapidly increasing transmission bandwidth. (Figure One)

Figure One

ZyXEL's FTTX Solutions



Triple Play

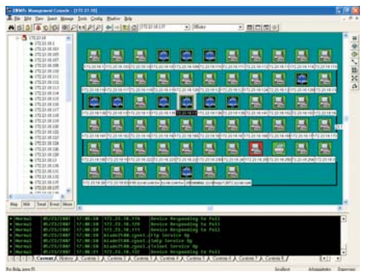
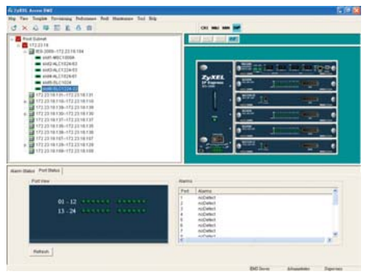
With over million ports deployed in video streaming environments, ZyXEL's MSAN provides comprehensive QoS such as Strict Priority Queuing (SPQ), Weighted Round Robin Scheduling (WRR) as well as IPTV related features including IGMP snooping, proxy and fast leave. The VoIP line card VOP1248G-61 provides aggregated 48 lines of Plain Office Telephone Service toward PSTN network. Each telephone line interface, Foreign Exchange Subscriber (FXS) connected with subscriber's telephone set through copper wire ranged up to 5 km. The analog voice signal from subscriber was converted to packet voice and transmitted toward called party through packet network. The VoIP line card uses either Session Initialization Protocol (SIP) or H.248 protocol for network signaling to establish or tear down a voice call. Advance call features like "three-party conference call","call forward","call waiting", etc. are integrated to make NGN migration become easy in access network deployment. Besides, to consider simplify access network convergence toward unified IP packet network, The VoIP line interface can co-exists with deployed ADSL2+ or VDSL2 service in the same paired copper wire without disturbing each other.

Integrated Management Platform for All DSLAM/MSAN Products

NetAtlas Access EMS can manage all kinds of ZyXEL's IP DSLAM/MSAN product portfolios, including IES-1000 series, IES-1248 series, IES-2000 series, IES-3000 series, IES-5000 series, IES-5005 series and IES-6000 series. Any of these ZyXEL devices can be automatically detected and represented by an icon on the map view of the EMS; and network operators can monitor the status with the icon colors, and read further OAM&P operation data by double-clicking on the icons. Key features including:

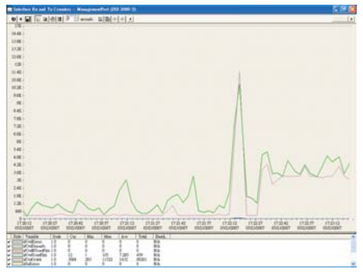
Features at a Glance

Network Topology View

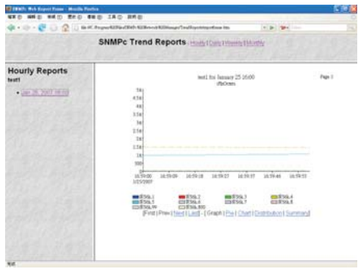
- **Tree View**
  - All managed network elements are shown in a tree structure of up to three layers: root map node, submap nodes and device nodes.
  - Each node contains its specific data.
- **Device View**
  - Add/delete a submap or device node and update device topology.
  - Query the status of a managed network element.

Performance Monitoring and Statistics Report



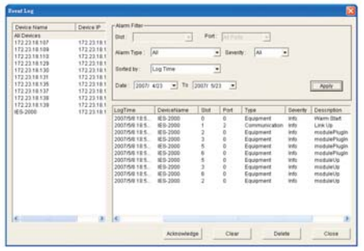
- Graph view and table view are supported for performance monitoring.

Trend Report



- Automatically generates scheduled daily, weekly, and monthly statistic reports. Report formats include graph, bar chart, distribution, and summary, and can be exported to a variety of destinations, including printers, files, or a WEB server.

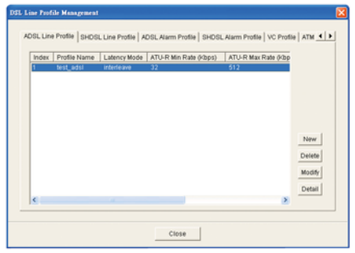
Alarm/Event Management



The NE will generate an alarm or event to notify the EMS via SNMP. The SNMP traps are defined in standard MIB and private MIB. The EMS receives and logs the SNMP traps generated by the NE.

- The EMS supports event browsing function by specifying the query conditions including IP address of NE, card ID, port ID, the event type, the severity, time period and the acknowledge status.
- The EMS supports the function to acknowledge alarms for keeping track of every alarm about by whom and at what time it is taken cared.
- The EMS supports the function to enable the clear flag of alarms for keeping track about by whom and at what time the alarms are cleared.

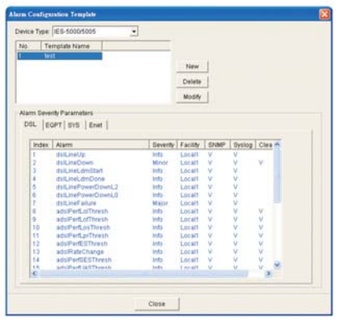
Template Setting for Fast Provisioning

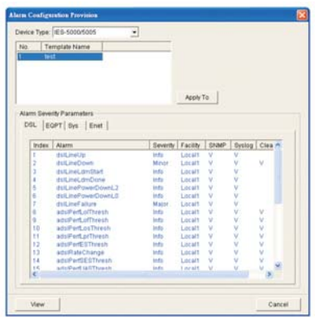


- The "Template setting" saves configuration templates for future use. The templates include DSL line profile template, service profile template, static VLAN template, static multicast group template, IGMP filtering template, alarm configuration template, multicast VLAN template and ACL rule template.

- The "Provisioning" function allows users to apply configuration templates to multiple network elements or device ports

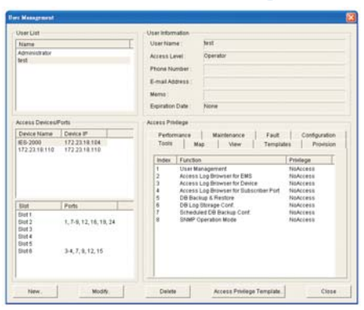
Alarm Configuration





- The function specifies the severity, facility and actions (including send trap, syslog or both) for each alarm in the alarm configuration template. The template is then provisioned to the network elements to enable the alarm mechanism.

View-based Network Management Functions (VBNMF)



- The system administrator can assign the access privilege and the access object scope of the network elements to different users. A MIB object can only be accessed by the users with authenticated access right and access scope privilege.

Which ZyXEL Product is Right for You?

Product Family	Your Requirement	Typical Application
IES-6000 **12.5U Central MSAN** **17 slots**	▪ 10G, Central, High Capacity ▪ Chassis based & hot swappable ▪ Ring or tree topology ▪ DHCP/PPPoA/PPPoE ▪ Mass flat layer-2 deployment ▪ Redundant Management Card & power supply ▪ 6 SFP + 4 100/1000BaseT/2 10G SPF + 6 100/1000BaseT ▪ ADSL2+, VDSL2, G.SHDSL.BIS, VoIP and fiber-based Ethernet line cards ▪ Multicast/Unicast IPTV service ▪ PSTN service replacement	Up to 1152 per node, xDSL service for mass residential and SMB services. 10G upgrade available to prevent limitation of future bandwidth requirement such as PON. Design for flat layer-2 mass deployment with Layer-2+ deployment that overcome 16K MAC address limitation of networks as well as legacy authentication
IES-5000 **6.5U Central/Remote MSAN** **8 slots**	▪ Central/Remote, temperature-hardened ▪ Chassis based & Hot Swappable ▪ Ring or tree topology ▪ DHCP/PPPoE/PPPoA ▪ Mass flat layer-2 deployment ▪ Redundant Management Card & power supply ▪ 4 SFP + 2 100/1000BaseT ▪ ADSL2+, VDSL2, G.SHDSL.BIS, VoIP and fiber-based Ethernet line cards ▪ Multicast/Unicast IPTV service ▪ PSTN service replacement	High density 384-port IP DSLAM that is well-suited for large-scale deployments in central office sites. Flexible xDSL provisioning to server residential and business coverage. Service aware for all application demands such as Internet access, streaming audio and video, online gaming, VoD, IPTV, and VoIP applications
IES-5005 **4U Remote MSAN** **4 slots**	▪ Remote & temperature-hardened ▪ Chassis based & hot swappable ▪ Ring or tree topology ▪ DHCP/ PPPoE/ PPPoA ▪ 4 SFP + 2 100/1000BaseT ▪ ADSL2+, VDSL2, G.SHDSL.BIS, VoIP and fiber-based Ethernet line cards ▪ Multicast/Unicast IPTV service ▪ PSTN service replacement	For less than 200-port density in space-limited environments and requiring chassis-based DSLAMs. Suitable for a central office or remote site to fulfill users with high-bandwidth demand such as Internet access, streaming audio and video, online gaming, VoD, IPTV, and multimedia applications. Enhanced backplane capacity for VDSL2 provisioning
IES-1248 **1.5U Temperature-hardened** **IP DSLAM**	▪ Remote & temperature-hardened ▪ Stand-alone & built-in splitter ▪ Ring or tree topology ▪ DHCP/PPPoE/PPPoA ▪ Wire Speed & redundant uplink ▪ Hot swappable Fan ▪ Multicast/Unicast IPTV service ▪ Triple play services ▪ 2 Gigabit SFP/Copper Combo 48 ports ADSL2+	Typical FTTX deployment for up to 144 ports per PoP density or for NGN IP migration. Temperature-hardened for setting up networks in remote locations to maximize ADSL bandwidth. Advanced QoS features for Internet access, streaming audio and video, online gaming, VoD, IPTV, and multimedia applications.
IES-1248-51V **1.5U Temperature-hardened** **Remote MSAN** **2 Gigabit SFP/Copper** **Combo 48 ports** **ADSL2+/VoIP**	▪ Remote & temperature-hardened ▪ Stand-alone & splitter built-in ▪ Ring or tree topology ▪ DHCP/PPPoE/PPPoA ▪ Wire Speed & redundant uplink ▪ Hot swappable Fan ▪ Multicast/Unicast IPTV service ▪ PSTN service replacement (SIP, H.248) ▪ 2 Gigabit SFP/Copper Combo 48 ports ADSL2+/VoIP	Focusing on future benefit of IMS IP core that Access Gateway is expecting to replace traditional class 4, class 5 switches via VoIP. Medium-size for density lower than 96 ports that two mature technology ADSL2+ and VoIP could be deployed at the same port. Aim for new community as well as business model of two play services. Full control of VoIP service at the CO site
IES-1000 **1U Mini IP DSLAM** **2 slots**	▪ Low density & multi-services ▪ AC/DC power input ▪ MAX. 24-port ADSL2+ ▪ MAX. 32-port G.SHDSL.bis	Application that requires low density connections but needs the flexibility of multi-services. Perfect solution for government wide areabroadband coverage deployment campaign.
IES-612-51 **1U Standalone Mini IP** **DSLAM**	▪ Low density ADSL2+ solution ▪ AC/DC power input ▪ MAX. 12-port ADSL2+	Perfect solution for entry level and low-density ADSL2+ solution deployment areas.
IES-708-22 **1U Standalone Mini IP** **DSLAM**	▪ Low density G.SHDSL solution ▪ AC/DC power input ▪ MAX. 8-port G.SHDSL.Bis ▪ ATM-based Multi-Pair Bonding (G.998.1) support	Perfect solution for entry level and low-density G.SHDSL solution deployment areas.
P-663H-51 **ADSL2+ Bonded** **4-port Router CPE**	▪ 2 ADSL2+ port bonding CPE ▪ ATM-based Multi-Pair Bonding (G.998.1) support ▪ DC Power Jack. (12V, 1.5A) ▪ 4-Port RJ-45 LAN connectors for 10/100 Mbps with Auto MDI/MDIX.	Application that requires high bandwidth performance at a long distance.

Product Line Highlight

Excellent system scalability and flexibility

- Comprehensive port density from a maximum of 1152 ports to a minimum of 12 ports for various deployment scenarios
- Diversified user interfaces including ADSL2+, G.SHDSL.bis, VDSL2, VoIP and active Ethernet fiber connections for various service requirements
- Provides future-proof 10G interface design for central office solutions and temperature-hardened capability for remote terminal/node solutions.
- Best suited for changing bandwidth requirements, the wire speed backplane is able to transfer at up to 2G per blade in remote VDSL2 applications.

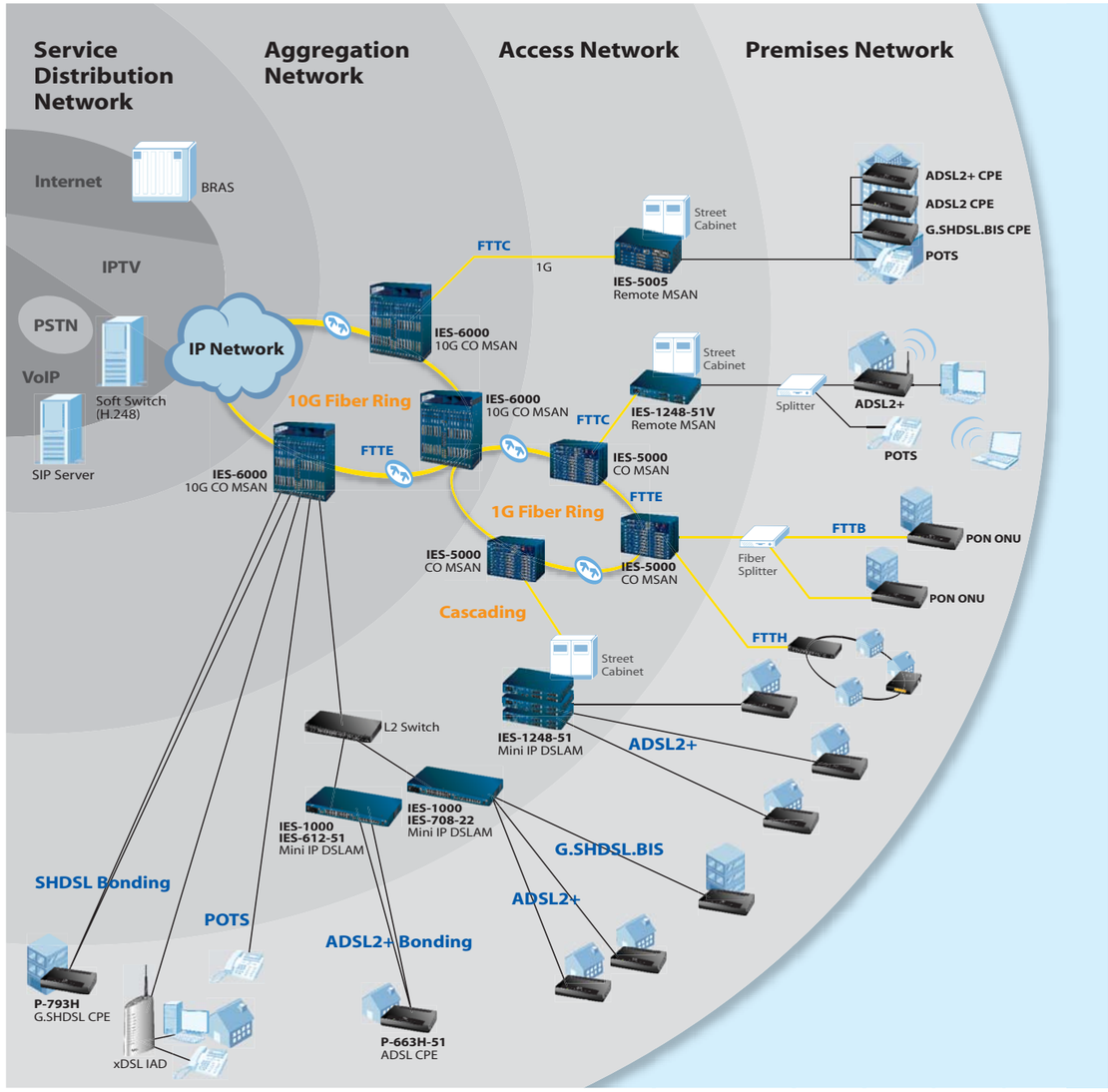
Field proven triple play service support

- Comprehensive QoS features that include 802.1p,ToS, DSCP mapping and ATM shaping
- Distributed multicasting implementation of IGMP V1, V2 snooping and proxy
- Fast leave and IPTV channel zapping time performance

Security enhancement for large-scale layer-2 infrastructure requirement

- Improved network stability via DHCP option 82 relay and built-in ARP proxy
- Support IP-aware bridging, Access Control List, VLAN aware DHCP and Anti-IP/MAC address spoofing features

Network Topology for MSAN Products



Product at a Glance

IES-6000

12.5U Central MSAN

The 12.5U high IES-6000 is a central office MSAN with Gigabit backplane which supports up to 16 vertical slots for any combination of the supported 48- port G.SHDSL/G.SHDSL.bis, 48-port or 72-port ADSL/ADSL2/ADSL2+ line cards and 24-port or 48-port VDSL2 line cards with ADSL2+ fall back feature. Carrier-class redundancy is also supported by the 2-slot MSC1024G/MSC1224G cards and 2 power input modules. The MSC cards provide sophisticated layer-2+ switching features and aggregate traffic from xDSL users into eight Gigabit Ethernet uplink interfaces. The maximum port capacity can be up to 768/1152 ports.

Key Features

- Gigabit backplane and DC powered
- 2 management switching cards and 2 power modules for redundancy
- 16 vertical slots for ADSL2+/G.SHDSL/G.SHDSL.bis/VoIP/VDSL2 line cards and 20-port SFP-based Fast Ethernet line card, hot swappable CO splitter cards in a separate splitter chassis
- 8 Gigabit Ethernet interfaces or 10G for uplink and subtending
- 802.1p QoS, priority queuing, 802.1q VLAN tagging, and multicast support
- 802.1x authentication, MAC/Packet filtering, and ACL filtering support

IES-5000

6.5U Central/Remote MSAN

The IES-5000 is a high-density IP DSLAM with Gigabit backplane which supports up to 8 slots for any combination of the supported 48-port G.SHDSL/G.SHDSL.bis, 48-port or 72-port ADSL2+ line cards and 24-port or 48-port VDSL2 line cards with ADSL2+ fall back feature. Carrier-class redundancy is also supported by the 2-slot MSC cards and 2 power input modules. The MSC cards provide sophisticated layer-2+ switching features and aggregate traffic from xDSL users into four Gigabit Ethernet uplink/subtending interfaces. The maximum port capacity can be up to 384/576 ports.

Key Features

- Gigabit backplane and DC powered
- 2 management switching cards and 2 power modules for redundancy
- 8 slots for ADSL2+/G.SHDSL/G.SHDSL.bis/VoIP/VDSL2 line cards and 20-port SFP-based Fast Ethernet line card, hot swappable CO splitter cards in a separate splitter chassis
- 4 Gigabit Ethernet interfaces for uplink and subtending
- 802.1p QoS, priority queuing, 802.1q VLAN tagging, and multicasting support
- 802.1x authentication, MAC/Packet filtering, and ACL filtering support

IES-5005

4U Remote MSAN

The IES-5005 is a remote chassis-based MSAN with Gigabit backplane which uses the same MSC and line cards as the IES-5000. Each IES-5005 provides one slide-in slot for an MSC card and four additional slots for any combination of the supported xDSL line cards. Two power input modules are provided for power redundancy. The maximum port capacity can be up to 192/288 ports.

Key Features

- 2 Gigabit backplane and DC powered
- One management switching card and two power modules for redundancy
- 4 slots for ADSL2+/G.SHDSL/G.SHDSL.bis/VoIP/VDSL2 line cards and 20-port SFP-based Fast Ethernet line card, hot swappable CO splitter cards in a separate splitter chassis
- 4 Gigabit Ethernet interfaces for uplink and subtending
- 802.1p QoS, priority queuing, 802.1q VLAN tagging, and multicasting support
- 802.1x authentication, MAC/Packet filtering, and ACL filtering support

IES-1248-51

Temperature-Hardened Mini IP DSLAM

As a standalone remote IP DSLAM with the highly compact and temperature-hardened design, the IES-1248 supports 48-port ADSL/ADSL2/ADSL2+ over POTS/ISDN with a built-in CO splitter. Each IES-1248 has two telco-50 connectors for ADSL/ADSL2/ADSL2+ lines and two telco-50 connectors for the built-in CO splitters. In addition, there are two combo Gigabit interfaces to support flexible uplink and subtending.

Key Features

- Remote IP DSLAM with AC or DC input connector
- Highly compact and temperature-hardened design
- In-band management and one mini RJ11 for local console
- 48-port ADSL/ADSL2/ADSL2+ module with built-in splitter
- Hot swappable fan module for flexibility
- Two Gigabit Ethernet interfaces for uplink and subtending
- 802.1p QoS, priority queuing, 802.1q VLAN tagging, and multicasting support
- 802.1x authentication, MAC/Packet filtering, and ACL filtering support
- Element Management System (EMS) for Windows or Unix

IES-1248-51V

Temperature-Hardened Remote MSAN

As a remote MSAN with the highly compact and temperature-hardened design, the IES-1248-51V supports 48-port ADSL/ADSL2/ADSL2+ over POTS with a built-in CO splitter. Each IES-1248-51V has two telco-50 connectors for either ADSL/ADSL2/ADSL2+ lines or POTS connections. In addition, it comes with two combo Gigabit interfaces to support flexible uplink and subtending.

Key Features

- Remote MSAN with DC input connector
- Temperature-hardened design
- One mini-RJ11 port for local console management and two RJ-45 ports for Test In/Out loop test
- Support ADSL/ADSL2/2+ CPE, POTS phone, Fax, Analog Modem and Pay phone connections
- Hot-swappable fan module for flexibility
- Two combo. GE ports for uplink and cascading with RJ-45 connectors and two SFP connectors.
- Support G.711 a/μ law, G.726, G.729 a/b G.723.1, T.38 Fax/Modem signal coding & Fax Relay (G.711 a/μ).
- Support silence detection/suppression and Comfort Noise Generation (CNG), Voice Activity Detection (VAD), Caller ID detection, Caller ID generation.
- MLT (Metallic loop testing for subscriber lines) and GR-909/GR844 loop diagnostics

IES-1000

Mini IP DSLAM

As a stand-alone multi-service IP DSLAM, the IES-1000 supports standard G.SHDSL, ADSL and ADSL2+ over POTS/ISDN with a built-in CO splitter. Each IES-1000 has two slide-in slots where either 8-port G.SHDSL line cards, 16-port G.SHDSL.bis line cards or 12-port ADSL2+ line cards with built-in CO splitters can be installed. The network administrator may determine the line-card combination to be used. Each ADSL2+/G.SHDSL.bis module can support two 10/100BaseT Fast Ethernet interfaces as uplink ports.

Key Features

- Mini IP DSLAM with AC or DC powered
- Two slide-in slots for various xDSL modules
- 12-port ADSL/ADSL2/ADSL2+ modules with built-in splitter
- 8-port G.SHDSL or 16-port G.SHDSL.bis module for long each and business applications
- One or two Fast Ethernet interfaces for uplink
- 802.1p QoS, priority queuing, 802.1q VLAN tagging, and multicasting support
- 802.1x authentication, MAC/Packet filtering, and ACL filtering support

IES-612-51

Standalone Mini IP DSLAM

The IES-612-51 is a standalone mini IP DSLAM supporting 12 standard ADSL2+ ports, and the design makes it easy for network administrators to determine the combination of line cards used. Each IES-612-51 supports two 10/100BaseT Fast Ethernet interfaces as uplink ports.

Key Features

- Mini IP DSLAM with AC or DC powered
- 12-port ADSL/ADSL2/ADSL2+ with built-in splitter
- Two Fast Ethernet interfaces for uplink
- 802.1p QoS, priority queuing, 802.1q VLAN tagging, and multicasting support
- 802.1x authentication, MAC/Packet filtering, and ACL filtering support

IES-708-22

Standalone Mini IP DSLAM

The IES-708-22 is a standalone mini IP DSLAM supporting 8 standard G.SHDSL ports, and the design makes it easy for network administrators to determine the combination of line cards used. Each IES-708-22 supports two 10/100BaseT Fast Ethernet interfaces as uplink ports.

Key Features

- Mini IP DSLAM with AC or DC powered
- MAX. 8-port G.SHDSL.Bis
- ATM-based Multi-Pair Bonding (G.998.1) support
- Two Fast Ethernet interfaces for uplink
- 802.1p QoS, priority queuing, 802.1q VLAN tagging, and multicasting support
- 802.1x authentication, MAC/Packet filtering, and ACL filtering support

P-663H-51

ADSL2+ 4-port Router CPE

The P-663H-51 is a router-based CPE, whose purpose is to co-work with ZyXEL series DSLAM/MSAN to provide ADSL2+ bonding solution for areas where more bandwidth is required, but VDSL solution is not feasible.

Key Features

- 2 ADSL2+ port bonding CPE
- ATM-based Multi-Pair Bonding (G.998.1) support
- DC Power Jack. (12V, 1.5A)
- 4-Port RJ-45 LAN connectors for 10/100 Mbps with Auto MDI/MDIX
- Provide an end-to-end solution for ADSL2+ bonding with any of above IP DSLAM products

System Architecture

System	Main Chassis	Splitter Chassis	Management and Switching Card	Line Card	Splitter Card
IES-6000	IES-6000M	IES-3016ST	MSC1024G MSC1224G (10G)	ALC1248G-51 ALC1248G-53 SLC1248G-22 VLC1224G-41 VOP1248G-61 (SIP) VOP1248G-61 (H.248) ALC1272G-51 VLC1324G-51 VLC1348G-51 ELC1220G-55	ASC1224-61 ASC1224-63U SEC1224 VSC1224-1
IES-5000	IES-5000M	IES-5000ST	MSC1000G	ALC1248G-51 ALC1248G-53 SLC1248G-22 VLC1224G-41 VOP1248G-61 (SIP) VOP1248G-61 (H.248) ALC1272G-51 VLC1324G-51 VLC1348G-51 ELC1220G-55	ASC1024-61 ASC1024-63/63U SEC1024 VSC1024-41
IES-5005	IES-5005M	IES-5005ST	MSC1000G	ALC1248G-51 ALC1248G-53 SLC1248G-22 VLC1224G-41 VOP1248G-61 (SIP) VOP1248G-61 (H.248) ALC1272G-51 VLC1324G-51 VLC1348G-51 ELC1220G-55	ASC1024-61 ASC1024-63/63U SEC1024 VSC1024-41
IES-1248	IES-1248-51 (DC) IES-1248-53 (DC) IES-1248-51A (AC)	NA	NA	(built-in)	NA
	IES-1248-51V (DC)	NA	NA	(built-in)	NA
IES-1000	IES-1000 (DC) IES-1000 (AC)	NA	NA	SAM1008 SAM1216-22 AAM1212-51 AAM1212-53	
IES-612-51	Standalone ADSL2+ Mini IP DSLAM	NA	NA	NA	NA
IES-708-22	Standalone G.SHDSL Mini IP DSLAM	NA	NA	NA	NA
P-663H-51	ADSL2+ 4-port Router CPE	NA	NA	NA	NA

MSAN Feature Matrix

Model		IES-612-51	IES-708-22	IES-1000	IES-1248-51
System Overview					
Category		IP DSLAM for Outside Plant (ADSL2+ only)	IP DSLAM for Outside Plant (G.SHDSL.bis only)	IP DSLAM for Outside Plant (Both ADSL2+ & G.SHDSL.bis)	IP DSLAM for Outside Plant (ADSL2+ only)
Dimensions W x D x H (mm)		270 x 350 x 44.45	270 x 350 x 44.45	440 x 320 x 44.5	270 x 350 x 44.45
Splitter		Built in		Built in	
Rack Mountable		19" 1U	19" 1U	19" 1U	19" 1U
Total Slots		Standalone	Standalone	2	Standalone
Max. xDSL Slots		Standalone	Standalone	2	Standalone
Max. xDSL Ports		12 (ADSL2+)	8 (ADSL2+)	24	48
Management & Switching Card Redundancy					
Power Input		AC or DC	AC or DC	AC or DC	AC or DC
Power Redundancy					
Hot Swappable				•	
Interfaces					
Uplink		2FE	2FE	2FE	2 100/1000Base-T or 2 Mini GBIC
Subtending		•	•	•	•
ADSL2/2+ Line Card		•		•	•
G.SHDSL.bis Line Card			•	•	
VDSL2 Line Card				• (Future)	
VoIP Line Card				• (Future)	
ADSL2/2+					
Annex M		•		•	•
SRA		•		•	•
INP (Min=2)		•		•	•
SELT		•		•	•
DELT		•		•	•
ADSL2+ Bonding		•		•	•
G.SHDSL					
N-wire Bonding (G.991.2)			•	•	
ATM-based Multi-Pair Bonding (G.998.1)			•		
VDSL2					
DS/US Speed (Mbps)					
Max. ports					
ADSL2+ Fallback					
CFM (802.1ag)					
SELT					
DELT					
VoIP					
Signaling Protocol				SIP/H.248 (Future)	
Voice Codec (G.711a/u, G.723, G.726, G.729ab)				•	
Metallic Line Test (MLT)					
DTMF				•	
Fax/Modem (T.38)				•	
Call Waiting/Hold/Transfer				•	
Dial Tone, Ringing Tone, Busy Tone				•	
QoS					
802.1p		4 queue	4 queue	4 queue	4 queue
802.1q (VLAN#)		256	256	256	1024
SPQ/WRR		SPQ	SPQ	SPQ	SPQ
Security					
IEEE 802.1x		•	•	•	•
Multiple PVC		8	8	8	8
Q in Q (VLAN Stacking)		•	•	•	•
DHCP Snooping		•	•	•	•
DHCP Relay option 82		•	•	•	•
MAC/Packet Filtering		•	•	•	•
MAC Count Filtering		•	•	•	•
802.3ad Link Aggregation					
IP Bridge					•
Multicast function					
IGMP v1/v2/v3	Snooping	• (no v3)	• (no v3)	•	•
	Proxy	• (no v3)	• (no v3)	•	•
	Multicast Group	256	256	256	512
Multicast VLAN	Static Multicast	•	•	•	•
	Multicast VLAN	•	•	•	•
Network Management					
SNMP v1, v2		•	•	•	•
SNMP v3					
Web Management		•	•	•	•
CLI Management		•	•	•	•
EMS Management		NetAtlas Accesss	NetAtlas Accesss	NetAtlas Accesss	NetAtlas Accesss

Model		IES-1248-51V	IES-5005	IES-5000	IES-6000
System Overview					
Category		MSAN for Outside Planet (Both ADSL2+ & VoIP)	MSAN for Outside Planet (ADSL2+, VoIP, G.SHDSL.bis, VDSL2, Active Fiber-base Ethernet)	MSAN for Central Office (ADSL2+, VoIP, G.SHDSL.bis, VDSL2, Active Fiber-based Ethernet)	MSAN for Central Office (ADSL2+, VoIP, G.SHDSL.bis, VDSL2, Active Fiber-based Ethernet)
Dimensions W x D x H (mm)		440 x 251 x 66	440 x 250 x 152	440 x 289 x 249	440 x 281 x 544
Splitter		Built in	Separated, IES-5005ST	Separated, IES-5000ST	Separated, IES-3016ST
Rack Mountable		19" 1.5U	19" 4U	19" 6.5U	19" 12.5U
Total Slots		Standalone	5	10	17
Max. xDSL Slots		Standalone	4	8	16
Max. xDSL Ports		48	192/288	384/576	786/1152
Management & Switching Card Redundancy				•	•
Power Input		AC or DC	DC	DC	DC
Power Redundancy			•	•	•
Hot Swappable			•	•	•
Interfaces					
Uplink		2 100/1000Base-T or 2 Mini GBIC	4GE	4GE	8GE or 2 x 10G +6 x GE
Subtending		•	•	•	•
ADSL2/2+ Line Card		•	•	•	•
G.SHDSL.bis Line Card			•	•	•
VDSL2 Line Card			•	•	•
VoIP Line Card		Build in	•	•	•
ADSL2/2+					
Annex M		•	•	•	•
SRA		•	•	•	•
INP (Min=2)		•	•	•	•
SELT		•	•	•	•
DELT		•	•	•	•
ADSL2+ Bonding		• (Future)	•	•	•
G.SHDSL					
N-wire Bonding (G.991.2)			•	•	•
ATM-based Multi-Pair Bonding (G.998.1)			•	•	•
VDSL2					
DS/US Speed (Mbps)			100/45	100/45	100/45
Max. Ports			24/48	24/48	24/48
ADSL2+ Fallback			•	•	•
CFM (802.1ag)			•	•	•
SELT			•	•	•
DELT			•	•	•
VoIP					
Signaling Protocol		SIP, H.248 (Future)	SIP/H.248	SIP/H.248	SIP/H.248
Voice Codec (G.711a/u, G.723, G.726, G.729ab)		•	•	•	•
Metallic Line Test (MLT)		•	•	•	•
DTMF		•	•	•	•
Fax/Modem (T.38)		•	•	•	•
Call Waiting/Hold/Transfer		•	•	•	•
Dial Tone, Ringing Tone, Busy Tone		•	•	•	•
QoS					
802.1p		4 queue	8 queue	8 queue	8 queue
802.1q (VLAN#)		1024	4K	4K	4K
SPQ/WRR		SPQ	SPQ, WRR	SPQ, WRR	SPQ, WRR
Security					
IEEE 802.1x		•	•	•	•
Multiple PVC		8	8	8	8
Q in Q (VLAN Stacking)		•	•	•	•
DHCP Snooping		•	•	•	•
DHCP Relay option 82		•	•	•	•
MAC/Packet Filtering		•	•	•	•
MAC Count Filtering		•	•	•	•
802.3ad Link Aggregation			•	•	•
IP Bridge		•	•	•	•
Multicast function					
IGMP v1/v2/v3	Snooping	•	•	•	•
	Proxy	•	•	•	•
	Multicast Group	512	256	256	512
Multicast VLAN	Static Multicast	•	•	•	•
	Multicast VLAN	•	•	•	•
Network Management					
SNMP v1, v2		•	•	•	•
SNMP v3			•	•	•
Web Management		•	•	•	•
CLI Management		•	•	•	•
EMS Management		NetAtlas Accesss	NetAtlas Accesss	NetAtlas Accesss	NetAtlas Accesss

Model Description

IES-6000	Descriptions	Part Number (STD)
IES-6000M	IES-6000 main chassis with 16 slots, two slots for MSC1024G cards and 15/16 slots for line cards, DC power input Dimensions: 440 (W) x 280 (D) x 540 (H) mm	91-004-656001B
MSC1024G	Management and switching card with 8 GE uplink ports	91-004-657001B
MSC1224G	Management and switching card with two 10G and 6 Gigabit Ethernet uplink ports	91-004-724001B
ALC1248G-51	48-port Annex A ADSL2/ADSL2+ line card (over POTS)	91-004-471001B
ALC1248G-53	48-port Annex B ADSL2/ADSL2+ line card (over ISDN)	91-004-476001B
ALC1272G-51	72-port Annex A ADSL2/ADSL2+ line card (over POTS)	91-004-708001B
SLC1248G-22	48-port G.SHDSL/G.SHDSL.bis line card	91-004-541001B
VLC1224G-41	24-port DMT-based 5-band VDSL2 line card (12a profile)	91-004-624001B
VLC1324G-51	24-port DMT-based 5-band VDSL2 line card (17a profile)	TBU
VLC1348G-51	48-port DMT-based 5-band VDSL2 line card (17a profile)	TBU
VOP1248G-61 (SIP)	48-port VoIP line card with supporting SIP	91-004-689001B
VOP1248G-61 (H.248)	48-port VoIP line card with supporting H.248	91-004-689002B
ELC1220G-55	20-port Fast Ethernet SFP (100BASE-FX, 100BASE-BX, and 100BASE-LX)	TBU
IES-3016ST	IES-3016ST splitter chassis with 16 slots for 24 port splitter cards. 3 x 3016ST to support full-loaded ALC1272G-51 line cards at IES-6000M. 2 x 3016ST to support full-loaded ALC1248G-51 line cards at IES-6000M. DImensions: 434.1 (W) x 219.4 (H) x 280 (D) mm	91-004-710001B
ASC1224-61	24-port Annex A ADSL/ADSL2+ splitter card (over POTS)	91-004-736001B
ASC1224-63U	24-port Annex B ADSL/ADSL2+ splitter card (over ISDN)	91-004-737001B
SEC1224	24-port G.SHDSL extension card	91-004-752001B
VSC1224-41	24-port DMT-based 5-band VDSL2 splitter card (over POTS)	91-004-755001B
IES-5000		
IES-5000M	IES-5000 main chassis with 10 slots, 8 slots for line cards and 2 slots for MSC cards for redundancy, DC power input Dimensions: 440 (W) x 288.9 (D) x 248.8 (H)mm	91-004-540001B
MSC1000G	Management and switching card with 4 GE uplink/subtending ports	91-004-543001B
ALC1248G-51	48-port Annex A ADSL2/ADSL2+ line card (over POTS)	91-004-471001B
ALC1248G-53	48-port Annex B ADSL2/ADSL2+ line card (over ISDN)	91-004-476001B
ALC1272G-51	72-port Annex A ADSL2/ADSL2+ line card (over POTS)	91-004-708001B
SLC1248G-22	48-port G.SHDSL/G.SHDSL.bis line card	91-004-541001B
VLC1224G-41	24-port DMT-based 5-band VDSL2 line card (12a profile)	91-004-624001B
VLC1324G-51	24-port DMT-based 5-band VDSL2 line card (17a profile)	TBU
VLC1348G-51	48-port DMT-based 5-band VDSL2 line card (17a profile)	TBU
VOP1248G-61 (SIP)	48-port VoIP line card with supporting SIP protocol	91-004-689001B
VOP1248G-61 (H.248)	48-port VoIP line card with supporting H.248 protocol	91-004-689002B
ELC1220G-55	20-port Fast Ethernet SFP (100BASE-FX, 100BASE-BX, and 100BASE-LX)	TBU
IES-5000ST	IES-5000 splitter chassis with 16 slots for 24-port POTS/ISDN splitter cards. The splitter card uses a telco-50 (RJ-21) cable that connects to xDSL subscriber interface module for xDSL services. The other connector links to MDF for POTS or ISDN access. Dimensions: 437.2 (W) x 239.1 (D) x 292 (H)mm	91-004-553001B
ASC1024-61	24-port Annex A ADSL/ADSL2+ splitter card (over POTS)	91-004-155001B
ASC1024-63	24-port Annex B ADSL/ADSL2+ splitter card (over ISDN)	91-004-156001B
ASC1024-63U	24-port ADSL/ADSL2+ universal splitter card (over POTS/ISDN)	91-004-156004B
SEC1024	24-port G.SHDSL extension card	91-004-148001B
VSC1024-41	24-port DMT-based 5-band VDSL2 splitter card (over POTS)	91-004-143001B

IES-5005	Descriptions	Part Number (STD)
IES-5005M	IES-5005 main chassis with 5 slots, 4 slots for line cards and 1 slot for MSC cards. DC power input Dimensions: 442.7 (W) x 268 (D) x 178 (H) mm	91-004-599001B
MSC1000G	Management and switching card with 4 GE uplink/subtending ports	91-004-543001B
ALC1248G-51	48-port Annex A ADSL2/ADSL2+ line card (over POTS)	91-004-471001B
ALC1248G-53	48-port Annex B ADSL2/ADSL2+ line card (over ISDN)	91-004-476001B
ALC1272G-51	72-port Annex A ADSL2/ADSL2+ line card (over POTS)	91-004-708001B
SLC1248G-22	48-port G.SHDSL/G.SHDSL.bis line card	91-004-541001B
VLC1224G-41	24-port DMT-based 5-band VDSL2 line card (12a profile)	91-004-624001B
VLC1324G-51	24-port DMT-based 5-band VDSL2 line card (17a profile)	TBU
VLC1348G-51	48-port DMT-based 5-band VDSL2 line card (17a profile)	TBU
VOP1248G-61 (SIP)	48-port VoIP line card with supporting SIP	91-004-689001B
VOP1248G-61 (H.248)	48-port VoIP line card with supporting H.248	91-004-689002B
ELC1220G-55	20-port Fast Ethernet SFP (100BASE-FX, 100BASE-BX, and 100BASE-LX)	TBU
IES-5005ST	IES-5005 splitter chassis with eight slots for 24-port POTS/ISDN splitter cards. The splitter card uses a telco-50 (RJ-21) cable that connects to the xDSL subscriber interface module for xDSL services. The other connector links back to MDF for POTS or ISDN access. Dimensions: 437.2 (W) x 280 (D) x 124 (H) mm	91-004-600001B
ASC1024-61	24-port Annex A ADSL/ADSL2+ splitter card (over POTS)	91-004-155001B
ASC1024-63	24-port Annex B ADSL/ADSL2+ splitter card (over ISDN)	91-004-156001B
ASC1024-63U	24-port ADSL/ADSL2+ universal splitter card (over POTS/ISDN)	91-004-156004B
SEC1024	24-port G.SHDSL extension card	91-004-148001B
VSC1024-41	24-port DMT-based 5-band VDSL2 splitter card (over POTS)	91-004-143001B
IES-1248		
IES-1248-51 (DC)	IES-1248 enclosure with 48-port Annex A ADSL2+ line and splitter over POTS, DC power input with temperature-hardened design Dimensions: 442.7 (W) x 250 (D) x 66 (H) mm	91-004-602001B
IES-1248-53 (DC)	IES-1248 enclosure with 48-port Annex B ADSL2+ line and splitter over ISDN, DC power input with temperature-hardened design Dimensions: 442.7 (W) x 250 (D) x 66 (H) mm	91-004-603001B
IES-1248-51A (AC)	IES-1248 enclosure with 48-port Annex A ADSL2+ line and splitter over POTS, AC power input Dimensions: 442.7 (W) x 250 (D) x 66 (H) mm	91-004-629001B
IES-1248-51V (DC)	IES-1248 enclosure with 48-port Annex A ADSL2+ and POTS line, DC power input Dimensions: 439.8 (W) x 251 (D) x 66 (H) mm	91-004-725001B
IES-1000		
IES-1000 (DC)	IES-1000 enclosure with two slide-in slots for DSL modules, DC power input Dimensions: 440 (W) x 320 (D) x 44.5 (H) mm	91-004-098016B
IES-1000 (AC)	IES-1000 enclosure with two slide-in slots for DSL modules, AC power input Dimensions: 440 (W) x 320 (D) x 44.5 (H) mm	91-004-098001B
SAM1008	8-port G.SHDSL line card	91-004-074001B
SAM1216-22	16-port G.SHDSL.bis line card	91-004-658001B
AAM1212-51	12-port Annex A ADSL2+ line card (over POTS) with splitters built-in	91-004-503001B
AAM1212-53	12-port Annex B ADSL2+ line card (over ISDN) with splitters built-in	91-004-584001B
IES-612-51	12-port ADSL2+ standalone mini-DSLAM, DC or AC power input Dimensions: 270 (W) x 350 (D) x 44.45 (H) mm	IES-612-51A: 91-004-757001B IES-612-51: 91-004-772001B
IES-708-22A	8-port G.SHDSL standalone mini-DSLAM, AC power input Dimensions: 270 (W) x 350 (D) x 44.45 (H) mm	IES-708-22A (STU-C): 91-004-759001B IES-708-22A (STU-R): 91-004-759002B
P-663H-51	ADSL2+ Bonded 4-port RouterCPE	91-004-760001B

Certificate

EMC/ESD

- FCC Part 15 Class A
- EN55022 Class A
- EN55024 Class A
- ETS300 386
- NEBS

Safety

- ITU-T K.20, Appendix C
- CSA 60950
- EN60950
- IEC60950
- UL60950
- NEBS

Reliability

- ETS300 019